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Abstract

DEVELOPMENT OF SUPERHEATING POWER REACTORS OF BELOYARSK NUCLEAR POWER STATION (БАЭС) TYPE

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Development of heat removal systems and technological flow sheets of a power station with direct cycle uranium-graphite tube type reactors and nuclear superheating of steam is discussed.

Succession of the development of this most promising type of modern direct cycle supercritical up to 800 Mw(e) reactors, direct descendants of the First Atomic Power Station of Academy of Sciences of the USSR, is shown.

The problems encountered during design and experimentation with the 200 Mw plant (2nd БАЭС unit) are considered.

Fuel element and channel designes, their position in the graphite moderated core and operation conditions, lattice spacing as well as meny features of the reactor concepts characteristic of different coolant flows and power ratings are discussed.

Increase in electrical, hence thermal power of the plant cause each fuel channel power rise.

The single fuel channel power rise is limited by:

- critical heat fluxes for steam generating tubes;
- maximum permissible fuel element can temperature in

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steam generating tubes.

This necessitates the development of more promising fuel channels and auxilliary equipment.

Main features of direct cycle reactor concept, namely feed water regime and steam reactivity problems, are mentioned.

Flow diagrams are described, and direct cycle advantages over those of indirect cycle concept are pointed out.

In conclusion, economics of the considered concepts is evaluated.